

1. Without plotting, tell in which quadrant the following points are found:

a)  $(4, -2)$

4

b)  $(6, 3)$

1

c)  $(-1, 3)$

2

d)  $(-2, -\frac{3}{2})$

3

2. Plot the following points on the grid provided:

A  $(-3, 1)$

B  $(-4, -2)$

C  $(-5, 0)$

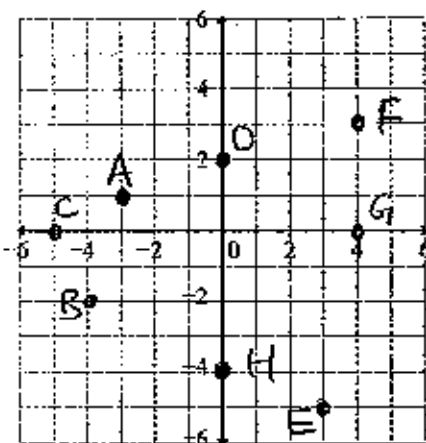
D  $(0, 2)$

E  $(3, -5)$

F  $(4, 3)$

G  $(4, 0)$

H  $(0, -4)$



3. Find the coordinates of the following points:

A  $(0, 0)$

B  $(4, 5)$

C  $(5, 0)$

D  $(3, -6)$

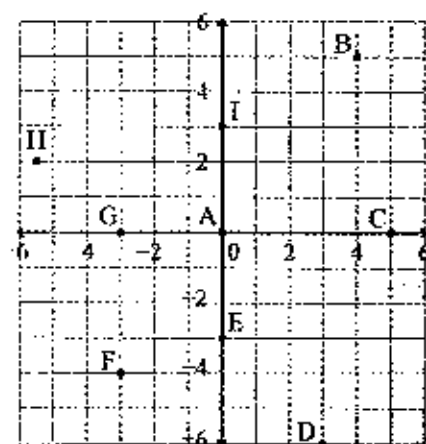
E  $(0, -3)$

F  $(-3, -4)$

G  $(-3, 0)$

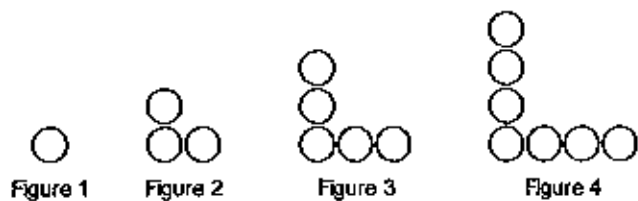
H  $(-5, 2)$

I  $(0, 3)$



4. This pattern of circles continues.

(a) Determine the equation that relates the number of circles to the figure number. Make sure you identify what each variable in the equation represents.



$x$  = figure number  
 $y$  = number of circles.

$x$	$y$
1	1
2	3
3	5
4	7

$\downarrow +2$   
 $\downarrow +2$   
 $\downarrow +2$

$$y = \frac{2}{1}x + b$$

$$y = 2x - 1$$

$$1 = 2(1) + b$$

$$1 = 2 + b$$

$$-1 = b$$

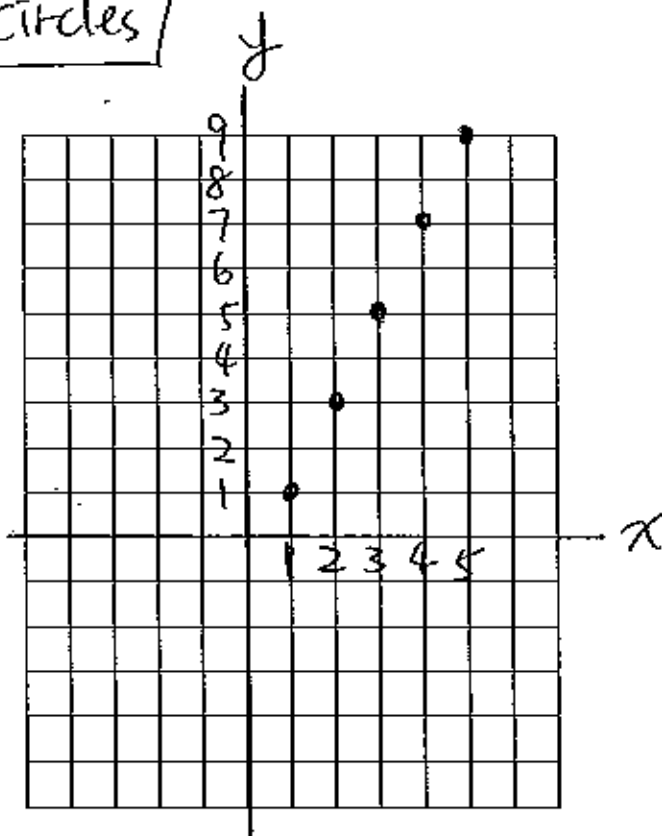
(b) Use the equation to predict how many circles are in the 15<sup>th</sup> figure.

$$y = 2(15) - 1 = 30 - 1 = 29 \text{ circles}$$

(b) Graph the relation.

Independent variable: Figure number

Dependent variable: number of circles.



5. This pattern of unit squares continues.

(a) Determine an equation that relates the number of unit squares,  $n$ , to the figure number,  $f$ .

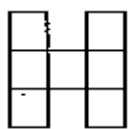


Figure 1

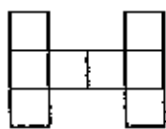


Figure 2

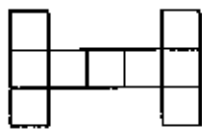


Figure 3

$f$	$n$
1	7
2	8
3	9

$$n = \frac{1}{1}f + b$$

$$7 = 1(1) + b$$

$$7 = 1 + b$$

$b = 6$

$$n = 1f + 6$$

(b) Use the equation to predict how many squares will be in the 33<sup>rd</sup> figure.

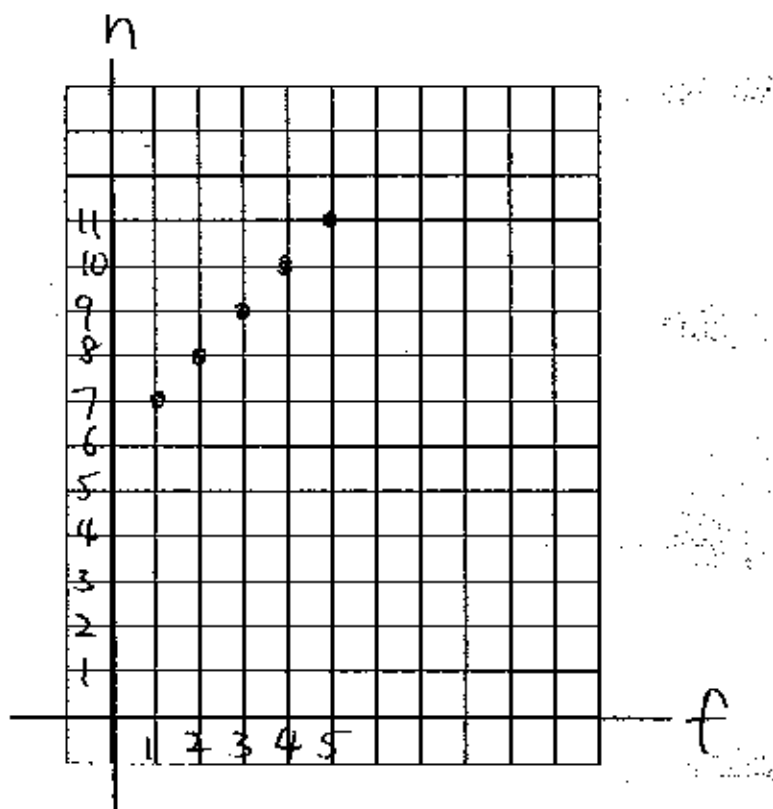
$$n = 1(33) + 6$$

$$= 33 + 6$$

$$n = 39 \text{ squares}$$

(c) Graph the relation.

Independent variable: Figure number  
 Dependent variable: number of squares.



6. Here is a pattern made with toothpicks.



Figure 1



Figure 2



Figure 3

(a) Write an equation that relates the number of toothpicks,  $N$ , to the figure number,  $n$ .

$n$	$N$
1	4
2	6
3	8

Arrows indicate a constant increase of +2 in  $N$  for each increase of 1 in  $n$ .

$$N = \frac{2}{1}n + b$$

$$4 = 2(1) + b$$

$$4 = 2 + b$$

$$b = 2$$

$$N = 2n + 2$$

(b) How many toothpicks are needed for figure 80?

$$N = 2(80) + 2$$

$$= 160 + 2 = 162 \text{ toothpicks}$$

(c) Graph the relation.

Independent variable: Figure number

Dependent variable: number of toothpicks

